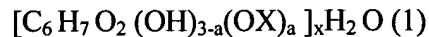


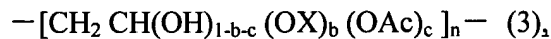
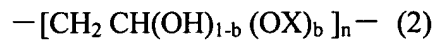
## AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

1. (Currently Amended): A non-viral gene delivery vector formed from an aqueous solution of [[A]] a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a  $-(CH_2)_m R_1$  organic radical where  $R_1$  is a member of the class consisting of:

$-NH_2$  radical,

$-N(CH_3)_2$  radical,

$-N(C_2H_5)_2$  radical,

$-N^+(C_2H_5)_3$  radical,

$-N^+(CH_2)_2CH_2CH(OH)CH_3$  radical,

$-N^+(C_2H_5)_2CH_2CH(OH)CH_3$  radical,

$-N^+(C_2H_5)_2(C_2H_5)N(C_2H_5)_2$  radical,

$-C_6H_4NH_2$  radical, [[and]]

$-COC_6H_4NH_2$  radical,

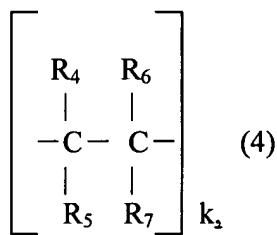
—COR<sub>2</sub> radical where R<sub>2</sub> is —CH<sub>2</sub>NH<sub>2</sub> or —C<sub>6</sub>H<sub>4</sub>NH<sub>2</sub>, and

—CH<sub>2</sub>CH(OH)CH<sub>2</sub>R<sub>3</sub> radical [[,]] where R<sub>3</sub> is —NH<sub>2</sub>, —N(CH<sub>3</sub>)<sub>2</sub>, —N(C<sub>2</sub>H<sub>5</sub>)<sub>2</sub>,

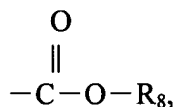
[[and]] or —N<sup>+</sup>(C<sub>2</sub>H<sub>5</sub>)<sub>3</sub> radical,

where m is a natural number of 1 to 3, a is a positive number having a value of 0 < a < 3, b is a positive number having a value of 0 < b < 1, x and n are natural numbers having a value of 5 or more, 1 > b + c, and Ac is acetyl radical; and

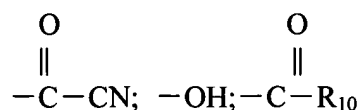
a unit derived from a polymerize-able olefin compound of the following formula (4):



wherein ~~Wherein~~ R<sub>4</sub>, R<sub>5</sub> and R<sub>6</sub> are each selected from the group consisting of hydrogen and CH<sub>3</sub>, and R<sub>7</sub> is a member of the group consisting of:

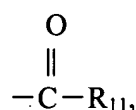


~~Where~~ where R<sub>8</sub> is a member of the class consisting of: hydrogen, C<sub>1</sub>—C<sub>12</sub> alkyl radicals, cyclohexyl radical, C<sub>1</sub>—C<sub>4</sub> hydroxyalkyl radicals, C<sub>1</sub>—C<sub>8</sub> aminoalkyl radicals, C<sub>1</sub>—C<sub>8</sub> dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C<sub>1</sub>—C<sub>4</sub> lower alkyl—substituted tetrahydrofuran radical, benzyl radical, [[the]] a (CH<sub>2</sub>CH<sub>2</sub>O)<sub>y</sub>CH<sub>2</sub>CH<sub>2</sub>OH radical where y is a positive integer from 1 to 10, and —N(R<sub>9</sub>)<sub>2</sub>, where the two [[R<sub>9</sub>,s]] R<sub>9</sub>'s which may be the same or different, are either hydrogen or a C<sub>1</sub>—C<sub>4</sub> alkyl radical;



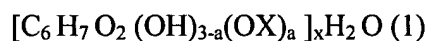
wherein ~~Wherein~~  $\text{R}_{10}$  is a  $\text{C}_1-\text{C}_8$  alkyl radical,  $[[;]]$  phenyl radical,  $[[;]]$  tolyl radical,

$[[;]]$  pyridine radical,  $[[;]]$  pyrrolidone radical; and

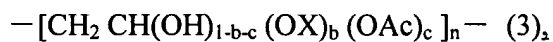
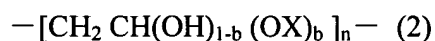


~~Where~~ where  $\text{R}_{11}$  is  $\text{NH}_2$ ,  $\text{NHCH}_3$ , N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical.

2. (Currently Amended): A process for preparing a non-viral gene delivery vector formed from an aqueous solution of a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups, for a non-viral gene delivery vector, which comprises reacting a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a  $-(\text{CH}_2)_m\text{R}_1$  organic radical where  $\text{R}_1$  is a member of the class consisting of:

$-\text{NH}_2$  radical,

$-\text{N}(\text{CH}_3)_2$  radical,

$-\text{N}(\text{C}_2\text{H}_5)_2$  radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_3$  radical,

$-\text{N}^+(\text{CH}_2)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$  radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$  radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{N}(\text{C}_2\text{H}_5)_2$  radical,

$-\text{C}_6\text{H}_4\text{NH}_2$  radical, [[and]]

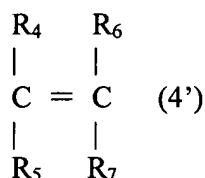
$-\text{COC}_6\text{H}_4\text{NH}_2$  radical,

$-\text{COR}_2$  radical where  $\text{R}_2$  is  $-\text{CH}_2\text{NH}_2$  or  $-\text{C}_6\text{H}_4\text{NH}_2$ , and

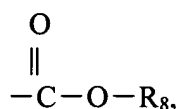
$-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{R}_3$  radical where  $\text{R}_3$  is  $-\text{NH}_2$ ,  $-\text{N}(\text{CH}_3)_2$ ,  $-\text{N}(\text{C}_2\text{H}_5)_2$ , [[and]]

or  $-\text{N}^+(\text{C}_2\text{H}_5)_3$  radical,

where m is a natural number of 1 to 3, a is a positive number having a value of  $0 < a < 3$ , b is a positive number having a value of  $0 < b < 1$ , x and n are natural numbers having a value of 5 or more,  $1 > b + c$ , and Ac is acetyl radical; with a polymerize-able olefin compound of the formula (4'):

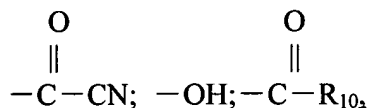


wherein ~~Wherein~~  $\text{R}_4$ ,  $\text{R}_5$  and  $\text{R}_6$  are each selected from the group consisting of hydrogen and  $\text{CH}_3$ , and  $\text{R}_7$  is a member of the group consisting of:

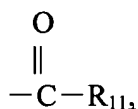


where ~~Where~~  $\text{R}_8$  is a member of the class consisting of hydrogen,  $\text{C}_1 - \text{C}_{12}$  alkyl radicals, cyclohexyl radical,  $\text{C}_1 - \text{C}_4$  hydroxyalkyl radicals,  $\text{C}_1 - \text{C}_8$  aminoalkyl radicals,  $\text{C}_1 - \text{C}_8$

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C<sub>1</sub>–C<sub>4</sub> lower alkyl  
 –substituted tetrahydrofuran radical, benzyl radical, ~~[[the]]~~ a (CH<sub>2</sub>CH<sub>2</sub> O)<sub>y</sub> CH<sub>2</sub>CH<sub>2</sub>OH  
 radical where y is a positive integer from 1 to 10, and –N(R<sub>9</sub>)<sub>2</sub> where the two ~~[[R<sub>9</sub>,s]]~~ R<sub>9</sub>'s  
 which may be the same or different, are either hydrogen or a C<sub>1</sub>–C<sub>4</sub> alkyl radical;

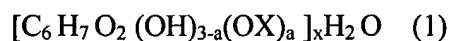


where ~~Where~~ R<sub>10</sub> is a C<sub>1</sub>–C<sub>8</sub> alkyl radical, ~~[[;]]~~ phenyl radical, ~~[[;]]~~ tolyl radical, ~~[[;]]~~  
 pyridine radical, ~~[[;]]~~ pyrrolidone radical; and

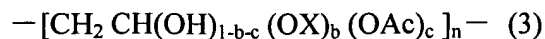
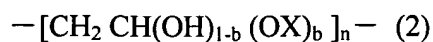


where ~~Where~~ R<sub>11</sub> is NH<sub>2</sub>, NHCH<sub>3</sub>, N,N-dimethylamino radical,  
 N,N-dimethylaminopropylamino radical, and morpholine radical.

3. (Currently Amended): A complex between a cationic graft-copolymer of a  
 water-soluble linear backbone polymer having hydroxyl groups and DNA, comprising a unit  
 derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or  
 a partial hydrolyzed alcohol of the following formula (3)

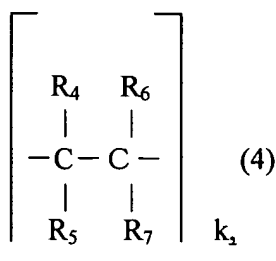


wherein ~~Wherein~~ X is a  $-(CH_2)_m R_1$  organic radical where  $R_1$  is a member of the class consisting of:

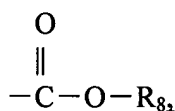
$-NH_3^+$  radical,  
 $-NH^+(CH_3)_2$  radical,  
 $-NH^+(C_2H_5)_2$  radical,  
 $-N^+(C_2H_5)_3$  radical,  
 $-N^+(CH_2)_2CH_2CH(OH)CH_3$  radical,  
 $-N^+(C_2H_5)_2CH_2CH(OH)CH_3$  radical,  
 $-N^+(C_2H_5)_2(C_2H_5)N(C_2H_5)_2$  radical,  
 $-C_6H_4NH_3^+$  radical, [[and]]  
 $-COC_6H_4NH_3^+$  radical,  
 $-COR_2$  radical where  $R_2$  is  $-CH_2NH_3^+$  or  $-C_6H_4NH_3^+$ , and  
 $-CH_2CH(OH)CH_2R_3$  radical where  $R_3$  is  $-NH_3^+$ ,  $-NH^+(CH_3)_2$ ,  $-NH^+(C_2H_5)_2$ ,  
[[and]] or  $-N^+(C_2H_5)_3$  radical,

where m is a natural number of 1 to 3, a is a positive number having a value of  $0 < a < 3$ ,  
b is a positive number having a value of  $0 < b < 1$ , x and n are natural numbers having a value  
of 5 or more,  $1 > b + c$ , and Ac is acetyl radical;

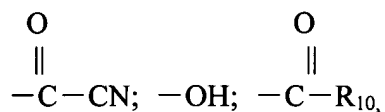
a unit derived from a polymerize-able olefin compound of the following formula (4)



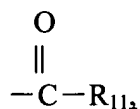
wherein ~~Wherein~~  $R_4$ ,  $R_5$  and  $R_6$  are each selected from the group consisting of hydrogen and  $CH_3$  and  $R_7$  is a member of the group consisting of:



~~where~~ ~~Where~~  $R_8$  is a member of the class consisting of hydrogen,  $C_1 - C_{12}$  alkyl radicals, cyclohexyl radical,  $C_1 - C_4$  hydroxyalkyl radicals,  $C_1 - C_8$  aminoalkyl radicals,  $C_1 - C_8$  dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical,  $C_1 - C_4$  lower alkyl -substituted tetrahydrofuran radical, benzyl radical, ~~[[the]]~~  $a (CH_2CH_2 O)_y CH_2CH_2OH$  radical where  $y$  is a positive integer from 1 to 10, and  $-N(R_9)_2$  where the two ~~[[R<sub>9</sub>,s]]~~  $R_9$ 's which may be the same or different, are either hydrogen or a  $C_1 - C_4$  alkyl radical;

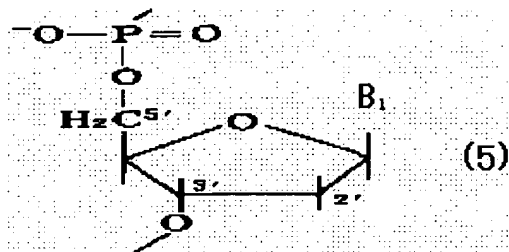


~~where~~ ~~Where~~  $R_{10}$  is a  $C_1 - C_8$  alkyl radical, ~~[[;]]~~ phenyl radical, ~~[[;]]~~ tolyl radical, ~~[[;]]~~ pyridine radical, ~~[[;]]~~ pyrrolidone radical; and



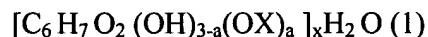
~~where~~ ~~Where~~  $R_{11}$  is  $NH_2$ ,  $NHCH_3$ ,  $N,N$ -dimethylamino radical,  $N,N$ -dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(deoxyribonucleotide) of the following formula (5) as a recurring unit[[]] :

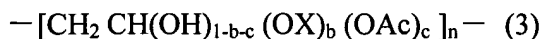
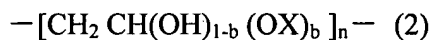


where ~~Where~~ B<sub>1</sub> is a base selected from the group of adenine, thymine, guanine, and cytosine.

4. (Currently Amended): A complex between a cationic graft-copolymer of a water-soluble linear backbone polymer having hydroxyl groups and RNA, comprising a unit derived from a cationic water-soluble linear polysaccharide of the following formula (1)



or a unit derived from a water-soluble linear polyvinylalcohol of the following formula (2) or a partial hydrolyzed alcohol of the following formula (3)



wherein ~~Wherein~~ X is a  $-(CH_2)_mR_1$  organic radical where R<sub>1</sub> is a member of the class consisting of:

$-NH_3^+$  radical,

$-NH^+(CH_3)_2$  radical,

$-NH^+(C_2H_5)_2$  radical,

$-N^+(C_2H_5)_3$  radical,

$-\text{N}^+(\text{CH}_2)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$  radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$  radical,

$-\text{N}^+(\text{C}_2\text{H}_5)_2(\text{C}_2\text{H}_5)\text{N}(\text{C}_2\text{H}_5)_2$  radical,

$-\text{C}_6\text{H}_4\text{NH}_3^+$  radical, [[and]]

$-\text{COC}_6\text{H}_4\text{NH}_3^+$  radical,

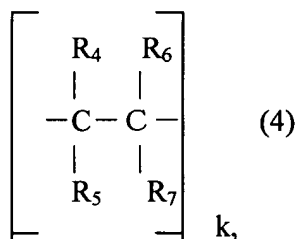
$-\text{COR}_2$  radical where  $\text{R}_2$  is  $-\text{CH}_2\text{NH}_3^+$  or  $-\text{C}_6\text{H}_4\text{NH}_3^+$ , and

$-\text{CH}_2\text{CH}(\text{OH})\text{CH}_2\text{R}_3$  radical where  $\text{R}_3$  is  $-\text{NH}_3^+$ ,  $-\text{NH}^+(\text{CH}_3)_2$ ,  $-\text{NH}^+(\text{C}_2\text{H}_5)_2$ ,

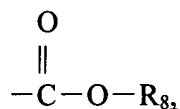
[[and]] or  $-\text{N}^+(\text{C}_2\text{H}_5)_3$  radical,

where m is a natural number of 1 to 3, a is a positive number having a value of  $0 < a < 3$ ,  
 b is a positive number having a value of  $0 < b < 1$ , x and n are natural numbers having a value  
 of 5 or more,  $1 > b + c$ , and Ac is acetyl radical;

a unit derived from a polymerize-able olefin compound of the following formula (4)

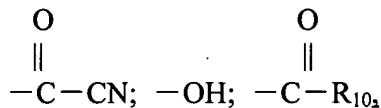


wherein ~~Wherein~~  $\text{R}_4$ ,  $\text{R}_5$  and  $\text{R}_6$  are each selected from the group consisting of hydrogen and  
 $\text{CH}_3$  and  $\text{R}_7$  is a member of the group consisting of:

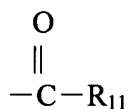


where ~~Where~~  $\text{R}_8$  is a member of the class consisting of hydrogen,  $\text{C}_1 - \text{C}_{12}$  alkyl radicals,  
 cyclohexyl radical,  $\text{C}_1 - \text{C}_4$  hydroxyalkyl radicals,  $\text{C}_1 - \text{C}_8$  aminoalkyl radicals,  $\text{C}_1 - \text{C}_8$

dialkylaminoalkyl radicals, glycidyl radical, tetrahydrofuran radical, C<sub>1</sub>-C<sub>4</sub> lower alkyl-substituted tetrahydrofuran radical, benzyl radical,  $[(CH_2CH_2O)_yCH_2CH_2OH]$  radical where y is a positive integer from 1 to 10, and  $-N(R_9)_2$  where the two  $R_9$ 's which may be the same or different, are either hydrogen or a C<sub>1</sub>-C<sub>4</sub> alkyl radical;

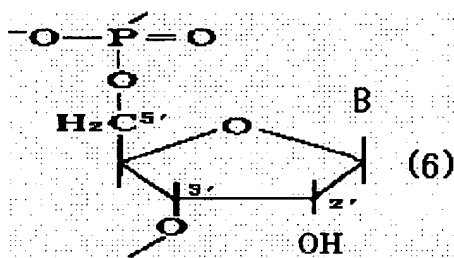


where ~~Where~~ R<sub>10</sub> is a C<sub>1</sub>-C<sub>8</sub> alkyl radical,  $[\text{phenyl}]$  phenyl radical,  $[\text{tolyl}]$  tolyl radical,  $[\text{pyridine}]$  pyridine radical,  $[\text{pyrrolidone}]$  pyrrolidone radical; and



where ~~Where~~ R<sub>11</sub> is NH<sub>2</sub>, NHCH<sub>3</sub>, N,N-dimethylamino radical, N,N-dimethylaminopropylamino radical, and morpholine radical; and

a unit derived from a poly(ribonucleotide) of the following formula (6) as a recurring unit $[\text{.}]$ :



where ~~Where~~ B is a base selected from the group of adenine, uracil, guanine, and cytosine.

5. (Currently Amended): A gene delivery system using  $[\text{a}]$  the complex between the cationic graft-copolymer and DNA  $[\text{.}]$  of Claim 3.

6. (Currently Amended): A gene delivery system using [[a]] the complex between the cationic graft-copolymer and RNA [[,]] of Claim 4.